

# FEDERAL FUNDING OPPORTUNITY

## FY 2005 Summer Undergraduate Research Fellowship - Gaithersburg

### **Overview Information**

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| 1. Federal Agency Name(s):                                  | Department of Commerce, National Institute of Standards and Technology (NIST) |
| 2. Funding Opportunity Title:                               | FY 2005 Summer Undergraduate Research Fellowship (SURF) - GAITHERSBURG        |
| 3. Announcement Type:                                       | Initial Announcement  |
| 4. Funding Opportunity Number:                              | 2005-SURF-G-01  |
| 5. Catalog of Federal Domestic Assistance (CFDA) Number(s): | 11.609  |
| 6. Dates:   | February 15, 2005, 5:00pm EST   |

Executive summary: The Summer Undergraduate Research Fellowship (SURF) Gaithersburg program is soliciting applications in the areas of Electronics and Electrical Engineering, Manufacturing Engineering, Chemical Science and Technology, Physics, Materials Science and Engineering, Building and Fire Research, and Information Technology.

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### **Full Text of Announcement**

#### a. Funding Opportunity Description:

The SURF Gaithersburg program is soliciting applications in the areas of Electronics and Electrical Engineering, Manufacturing Engineering, Chemical Science and Technology, Physics, Materials Science and Engineering, Building and Fire Research, and Information Technology.

The SURF program will provide an opportunity for the NIST laboratories and the National Science Foundation (NSF) to join in a partnership to encourage outstanding undergraduate students to pursue careers in science and engineering. The program will provide research opportunities for students to work with internationally known NIST scientists, to expose them to cutting-edge research and promote the pursuit of graduate degrees in science and engineering.

The NIST SURF Gaithersburg will work with appropriate department chairs, outreach coordinators, and directors of multi-disciplinary academic organizations to identify outstanding undergraduates (including graduating seniors) who would benefit from off-campus summer research in a world-class scientific environment.

The objective of the SURF Programs is to build a mutually beneficial relationship between the student, the institution, and NIST. NIST is one of the nation's premiere research institutions for the physical and engineering sciences and, as the lead Federal agency for technology transfer, it provides a strong interface between government, industry and academia. NIST embodies a special science culture, developed from a large and well-equipped research staff that enthusiastically blends programs that address the immediate needs of industry with longer-term research that anticipates future needs. This occurs in few other places and enables the Electronics and Electrical Engineering Lab (EEEL), Manufacturing Engineering Lab (MEL), Chemical Science and Technology Lab (CSTL), Physics Lab (PL), Materials Science and Engineering Lab (MSEL), Building and Fire Research Lab (BFRL), and Information

Technology Lab (ITL) to offer unique research and training opportunities for undergraduates, providing them a research-rich environment and exposure to state of the art equipment.

NIST's EEEL strives to be the world's best source of fundamental and industrial-reference measurement methods and physical standards for electrotechnology. To be a world-class resource for semiconductor measurements, data, models, and standards focused on enhancing U.S. technological competitiveness in the world market, research is conducted in semiconductor materials, processing, devices, and integrated circuits to provide, through both experimental and theoretical work, the necessary basis for understanding measurement-related requirements in semiconductor technology. To provide the world's most technically advanced and fundamentally sound basis for all electrical measurements in the United States, the EEEL's research projects include maintaining and disseminating the national electrical standards, developing the measurement methods and services needed to support electrical materials, components, instruments, and systems used for the generation, transmission, and application of conducted electrical power, and related activities in support of the electronics industry including research on video technology and electronic product data exchange.

NIST's MEL conducts theoretical and experimental research in length, mass, force, vibration, acoustics, and ultrasonics, as well as intelligent machines, precision control of machine tools, and information technology for the integration of all elements of a product's life cycle. Much of this applied research is devoted to overcoming barriers to the next technological revolution, in which manufacturing facilities are spread across the globe. MEL's research and development leads to standards, test methods and data that are crucial to industry's success in exploiting advanced manufacturing technology. Critical components of manufacturing at any level are measurement and measurement-related standards, not just of products, but increasingly of information about products and processes. Thus, MEL programs enhance both physical and information-based measurements and standards. Research projects can be theoretical or experimental, and will range in focus from intelligent machine control, characterizing a manufacturing process or improving product data exchange in manufacturing and related industries such as healthcare, to the accurate measurement of an artifact's dimensions.

NIST's CSTL strives to be a world-class research laboratory that is recognized by the nation as the primary source for the chemical, biochemical, and chemical engineering measurements, data, models, and reference standards that are required to enhance U.S. industrial competitiveness in the world market. CSTL is the primary reference laboratory for chemical measurements, entrusted with developing, maintaining, advancing, and enabling the chemical measurement system for the United States of America, thereby enhancing industry's productivity and competitiveness, establishing comparability of measurements to facilitate equity of global trade, and improving public health, safety, and environmental quality. CSTL's activities include: Transportation, Biomaterials, Biotechnology, Chemical and Allied Products, Energy Systems, Environmental Technology and Systems, Health and Medical Products and Services, Industrial and Analytical Instruments and Services, Forensics, Microelectronics, Food and Nutritional Products, International Measurement Standards, Data and Informatics, and emerging Technologies (Nanotechnology, Molecular Electronics, Microfluidics, Combinatorial Chemistry).

Attending to the long-term needs of many U.S. high-technology industries, NIST's PL conducts basic research in the areas of quantum, electron, optical, atomic, molecular, and radiation physics. To achieve these goals, PL staff develop and utilize highly specialized equipment, such as polarized electron microscopes, scanning tunneling microscopes, lasers, and x-ray and synchrotron radiation sources. Research projects can be theoretical or experimental and will range in focus from computer modeling of fundamental processes through trapping atoms and choreographing molecular collisions, to standards for radiation therapy.

NIST's MSEL conducts basic research in the electronic, magnetic, optical, superconducting, mechanical, thermal, chemical, and structural properties of metals, ceramics, polymers, and composites. Much of this applied research is devoted to overcoming barriers to the next technological revolution, in which individual atoms and molecules will serve as the fundamental building blocks of devices. Preparation of unique materials by atomic level tailoring of multi-layers, perfect single crystals, and nanocomposites are just some of the future technologies being developed and explored in NIST's MSEL. To achieve these goals, staff develop and utilize highly specialized equipment, such as high resolution electron microscopes, atomic force microscopes, neutron scattering instruments, x-ray diffraction sources, lasers, magnetometers, plasma furnaces, melt spinners, molecular beam epitaxy systems, and thermal spray systems. Research projects can be theoretical or experimental and will range in focus from the structural, chemical,

and morphological characterization of advanced materials made in the NIST laboratories to the accurate measurement of the unique properties possessed by these special materials.

NIST's BFRL provides technical leadership and participates in developing the measurement and standards infrastructure related to materials critical to U.S. industry, academia, government, and the public. Building and Fire Research programs at NIST cover a full range of materials issues from design to processing to performance. Separate research initiatives address concrete, coating, earthquake resistance of structures, fire science and engineering, the theory and modeling of materials, and materials reliability. Through laboratory-organized consortia and one-on-one collaborations, BFRL's scientists and engineers work closely with industrial researchers, manufacturers of high-technology products, and the major users of advanced materials.

NIST's ITL responds to industry and user needs for objective, neutral tests for information technology. These are enabling tools that help companies produce the next generation of products and services, and that help industries and individuals use these complex products and services. ITL works with industry, research and government organizations to develop and demonstrate tests, test methods, reference data, proof of concept implementations and other infrastructural technologies. Program activities include: high performance computing and communications systems; emerging network technologies; access to, exchange, and retrieval of complex information; computational and statistical methods; information security; and testing tools and methods to improve the quality of software.

SURF students will have the opportunity to work one-on-one with our nation's top scientists and engineers. It is anticipated that successful SURF students will move from a position of reliance on guidance from their research advisors to one of research independence during the twelve-week period. One goal of this partnership is to provide opportunities for our nation's next generation of scientists and engineers to engage in world-class scientific research at NIST, especially in ground-breaking areas of emerging technologies. This carries with it the hope of motivating individuals to pursue a Ph.D. in physics, chemistry, materials science, engineering, mathematics, or computer science, and to consider research careers.

The authority for the SURF program is 15 U.S.C. § 278g-1, which authorizes NIST to fund financial assistance awards to students at institutions of higher learning within the United States. These students must show promise as present or future contributors to the missions of NIST. [Also add citation to SURF FRN if we can] [Note--see Chapter 19, Sec. B.2.a., last sentence, about why this information goes here].

#### b. Award Information

Funds budgeted for payment to students under this program are stipends, not salary. The SURF Gaithersburg Programs will not authorize funds for indirect costs or fringe benefits. The table below summarizes the anticipated annual funding levels from the NSF to operate our REU (Research Experience for Undergraduates) programs, subject to program renewals and availability of funds. In some programs, anticipated NIST co-funding will supplement the number of awards supported. Program funding will be available to provide for the costs of stipends (\$333.33 per week per student), travel, and lodging (up to \$2800 per student).

Program	Anticipated NSF Funding	Anticipated NIST Funding	Total Program Funding	Anticipated No. of Awards
EEEL	\$73,000	\$30,000	\$103,000	~16
MEL	\$82,000	\$24,000	\$106,000	~14
CSTL	\$41,000	\$57,000	\$98,000	~15
PL	\$95,000	\$50,000	\$145,000	~23
MSEL	\$80,000	\$0	\$80,000	~12
BFRL	\$65,000	\$30,000	\$95,000	~14
ITL	\$60,000	\$40,000	\$100,000	~17

The actual number of awards made under this announcement will depend on the proposed budgets and the availability of funding.

The funding instrument will be a cooperative agreement as NIST will be substantially involved in the program due to collaboration with funding recipients in the scope of work.

NIST expects that individual awards to institutions will range from approximately \$3,000 to \$70,000.

Funding for student housing will be included in cooperative agreements awarded as a result of this notice.

The SURF Gaithersburg Programs are anticipated to run from May 23, 2005 through August 12, 2005; adjustments may be made to accommodate specific academic schedules (e.g., a limited number of 9-week cooperative agreements).

#### c. Eligibility Information

##### 1. Eligible Applicants

NIST's SURF Gaithersburg Programs are open to colleges and universities in the United States and its territories with degree granting programs in materials science, chemistry, engineering, computer science, mathematics, or physics. Participating students must be U.S. citizens or permanent U.S. residents.

2. Cost Sharing or Matching: The SURF Gaithersburg Programs do not require any matching funds.

#### d. Application and Submission Information

##### 1. Address to Request Application Package

Users of Grants.gov ([www.grants.gov](http://www.grants.gov)) will be able to download a copy of the application package, complete it off line, and then upload and submit the application package and associated proposal information via the Grants.gov website.

For electronic submission - Applicants should follow the Application Instructions provided at Grants.gov when submitting a response to this funding opportunity. Applicants are encouraged to start early and not wait to the approaching due date before logging on and reviewing the instructions for submitting an application through Grants.gov.

For paper submission - For the EEEL, MEL, CSTL, PL, MSEL, BFRL, and ITL SURF Gaithersburg Programs, an application kit, containing all required forms and certifications, may be obtained by contacting Ms. Anita Sweigert, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8400, Gaithersburg, MD 20899-8400, (301) 975-4200. An application kit for the Gaithersburg programs may also be accessed through the following website: <http://www.surf.nist.gov/surf2.htm>. Applicant institutions must submit one (1) signed original and two (2) copies of the application.

## 2. Content and Form of Application Submission

All SURF Gaithersburg Program proposals are submitted to the Administrative Coordinator, Ms. Anita Sweigert National Institute of Standards and Technology, 100 Bureau Drive, Stop 8400, Gaithersburg, MD 20899-8400. Each proposal is examined for completeness and responsiveness. Incomplete or non-responsive proposals will not be considered for funding, and the applicant will be notified in writing. The Program will retain one copy of each non-responsive application for three years for record keeping purposes. The remaining copies will be destroyed. Proposals should include the following:

### (A) Student Information:

- (1) student application information cover sheet;
- (2) academic transcript for each student nominated for participation (it is recommended that students have a G.P.A. of 3.0 or better, out of a possible 4.0);
- (3) a statement of motivation and commitment from each student to participate in the 2005 SURF program, including a description of the student's prioritized research interests;
- (4) a resume for each student;
- (5) two letters of recommendation for each student;
- (6) verification of U.S. citizenship or permanent legal resident status for each student; and
- (7) verification of health coverage for each student.

### (B) Information About the Applicant Institution:

- (1) description of the institution's education and research programs; and
- (2) a summary list of the student(s) being nominated.

Institution proposals will be separated into student/institution packets. Each student/institution packet will be comprised of the required application forms, including a complete copy of the student information and a complete copy of the institution information. The student/institution packets will be directed to the SURF Gaithersburg Program designated by the student as his/her first choice.

3. Submission Dates and Times: All SURF Gaithersburg Program applications, paper and electronic, must be received no later than 5:00 p.m. Eastern Standard Time on February 15, 2005.

4. Intergovernmental Review: Executive Order 12372: Applications under this program are not subject to Executive Order 12372, "Intergovernmental Review of Federal Programs."

5 Funding Restrictions - None

6. Other Submission Requirements - None

### e. Application Review Information

1. Criteria: For the SURF Gaithersburg Programs, the evaluation criteria are:

(A) Evaluation of Student's Academic Ability and Commitment to Program Goals: Includes evaluation of completed course work; expressed research interest; compatibility of the expressed research interest with SURF Gaithersburg Program research areas; research skills; grade point average in courses relevant to the SURF Gaithersburg Program; career goals; honors and activities.

(B) Evaluation of Applicant Institution's Commitment to Program Goals: Includes evaluation of the institution's academic department(s) relevant to the discipline(s) of the student(s).

Each of these factors is given equal weight in the evaluation process.

## 2. Review and Selection Process

Each SURF Gaithersburg Program will have three independent, objective NIST employees, who are knowledgeable in the scientific areas of the program, conduct a technical review of each student/institution packet based on the Evaluation Criteria for the SURF Gaithersburg Programs described in this notice. Each technical reviewer will recommend that each student/institution packet be placed into one of three categories: Priority Funding; Fund if Possible; and Do Not Fund. Each student/institution packet will then be placed into one of the three categories by the Program's Director, who will take into consideration the reviewers' recommendations, the relevance of the student's course of study to the program objectives of the NIST laboratory in which that SURF Gaithersburg Program resides as described in the Funding Opportunity Description section of this notice, the relevance of the student's statement of commitment to the goals of the SURF Gaithersburg Program, and the availability of funding.

Student/institution packets placed in the Priority Funding category will be selected for funding in that SURF Gaithersburg Program. Student/institution packets placed in the Do Not Fund category will not be considered for funding.

Student/institution packets placed in the Fund if Possible Category will be considered for funding by the SURF Gaithersburg Program designated by the student as his/her second choice. In making selections for funding, the Director of the student's second choice SURF Gaithersburg Program will take into consideration the recommendations of the reviewers who conducted the technical reviews for the student's first choice SURF Gaithersburg Program, the program objectives of the NIST laboratory in which the student's second choice SURF Gaithersburg Program resides as described in the Funding Opportunity Description section of this notice, the relevance of the student's statement of commitment to the goals of the SURF Gaithersburg Program, and the availability of funding.

Students not selected for funding by their first or second choice SURF Gaithersburg Program, and students who did not designate a second choice, will then be considered for funding from all SURF Gaithersburg Programs that still have slots available. In making selections for funding, the SURF Gaithersburg Program Directors will take into consideration the recommendations of the reviewers who conducted the technical reviews for the student's first choice SURF Gaithersburg Program, the program objectives of the NIST laboratory in which their SURF Gaithersburg Program resides as described in the Program Description section of this notice, the relevance to the goals of the SURF Gaithersburg Program, and the availability of funding.

Student/institution packets placed in the Fund if Possible category, but not selected through the process described above, will not be funded.

The final approval of selected applications and award of cooperative agreements will be made by the NIST Grants Officer based on compliance with application requirements as published in this notice, compliance with applicable legal and regulatory requirements, compliance with Federal policies that best further the objectives of the Department of Commerce, and whether the recommended applicants appear to be responsible. Applicants may be asked to modify objectives, work plans, or budgets and provide supplemental information required by the agency prior to award. The decision of the Grants Officer is final.

The SURF Gaithersburg Program will retain one copy of each unsuccessful application for three years for record keeping purposes, and unsuccessful applicants will be notified in writing. The remaining copies will be destroyed.

## 3. Anticipated Announcement and Award Dates – none

### f. Award Administration Information

#### 1. Award Notices

Successful finalists will receive a cooperative agreement award document from the Grant Officer. The document will be mailed via surface mail in triplicate. The recipient should have an authorized official at the organization sign and return two copies to the address listed in the award document. The award document will also include the

standard terms and conditions, general terms and conditions (if any), and special award conditions (if any) that are applicable.

## 2. Administrative and National Policy Requirements

### **The Department of Commerce Pre-Award Notification Requirements for Grants and Cooperative**

**Agreements:** The Department of Commerce Pre-Award Notification Requirements for Grants and Cooperative Agreements contained in the Federal Register notice of October 1, 2001 (66 FR 49917), as amended by the Federal Register notice published on October 30, 2002 (67 FR 66109), are applicable to this announcement. On the form SF-424, the applicant's 9-digit Dun and Bradstreet Data Universal Numbering System (DUNS) number must be entered in the Applicant Identifier block (68 FR 38402).

**Collaborations with NIST Employees:** All applications should include a description of any work proposed to be performed by an entity other than the applicant, and the cost of such work should ordinarily be included in the budget.

If an applicant proposes collaboration with NIST, the statement of work should include a statement of this intention, a description of the collaboration, and prominently identify the NIST employee(s) involved, if known. Any collaboration by a NIST employee must be approved by appropriate NIST management and is at the sole discretion of NIST. Prior to beginning the merit review process, NIST will verify the approval of the proposed collaboration. Any unapproved collaboration will be stricken from the proposal prior to the merit review.

**Use of NIST Intellectual Property:** If the applicant anticipates using any NIST-owned intellectual property to carry out the work proposed, the applicant should identify such intellectual property. This information will be used to ensure that no NIST employee involved in the development of the intellectual property will participate in the review process for that competition. In addition, if the applicant intends to use NIST-owned intellectual property, the applicant must comply with all statutes and regulations governing the licensing of Federal government patents and inventions, described at 35 U.S.C. sec. 200-212, 37 CFR part 401, 15 CFR 14.36, and in section 20 of the Department of Commerce Pre-Award Notification Requirements, 66 FR 49917 (2001), as amended by the Federal Register notice published on October 30, 2002 (67 FR 66109). Questions about these requirements may be directed to the Counsel for NIST, 301-975-2803.

Any use of NIST-owned intellectual property by a proposer is at the sole discretion of NIST and will be negotiated on a case-by-case basis if a project is deemed meritorious. The applicant should indicate within the statement of work whether it already has a license to use such intellectual property or whether it intends to seek one.

If any inventions made in whole or in part by a NIST employee arise in the course of an award made pursuant to this notice, the United States government may retain its ownership rights in any such invention. Licensing or other disposition of NIST's rights in such inventions will be determined solely by NIST, and include the possibility of NIST putting the intellectual property into the public domain.

**Initial Screening of all Applications:** All applications received in response to this announcement will be reviewed to determine whether or not they are complete and responsive to the scope of the stated objectives for each program. Incomplete or non-responsive applications will not be reviewed for technical merit. The Program will retain one copy of each non-responsive application for three years for record keeping purposes. The remaining copies will be destroyed.

**Paperwork Reduction Act:** The standard forms in the application kit involve a collection of information subject to the Paperwork Reduction Act. The use of Standard Forms 424, 424A, 424B, SF-LLL, and CD-346 have been approved by OMB under the respective Control Numbers 0348-0043, 0348-0044, 0348-0040, 0348-0046, and 0605-0001.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection subject to the requirements of the Paperwork Reduction Act, unless that collection of information displays a currently valid OMB Control Number.

**Research Projects Involving Human Subjects, Human Tissue, Data or Recordings Involving Human Subjects:**

Any proposal that includes research involving human subjects, human tissue, data or recordings involving human subjects must meet the requirements of the Common Rule for the Protection of Human Subjects, codified for the Department of Commerce at 15 CFR part 27. In addition, any proposal that includes research on these topics must be in compliance with any statutory requirements imposed upon the Department of Health and Human Services (DHHS) and other federal agencies regarding these topics, all regulatory policies and guidance adopted by DHHS, FDA, and other Federal agencies on these topics, and all Presidential statements of policy on these topics.

On December 3, 2000, the U.S. Department of Health and Human Services (DHHS) introduced a new Federal-wide Assurance of Protection of Human Subjects (FWA). The FWA covers all of an institution's Federally supported human subjects research, and eliminates the need for other types of Assurance documents. The Office for Human Research Protections (OHRP) has suspended processing of multiple project assurance (MPA) renewals. All existing MPAs will remain in force until further notice. For information about FWAs, please see the OHRP Web site at <http://ohrp.osophs.dhhs.gov/humansubjects/assurance/fwasc.htm>

In accordance with the DHHS change, NIST will continue to accept the submission of human subjects protocols that have been approved by Institutional Review Boards (IRBs) possessing a current, valid MPA from DHHS. NIST also will accept the submission of human subjects protocols that have been approved by IRBs possessing a current, valid FWA from DHHS. NIST will not issue a single project assurance (SPA) for any IRB reviewing any human subjects protocol proposed to NIST.

On August 9, 2001, the President announced his decision to allow Federal funds to be used for research on existing human embryonic stem cell lines as long as prior to his announcement (1) the derivation process (which commences with the removal of the inner cell mass from the blastocyst) had already been initiated and (2) the embryo from which the stem cell line was derived no longer had the possibility of development as a human being. NIST will follow guidance issued by the National Institutes of Health at <http://ohrp.osophs.dhhs.gov/humansubjects/guidance/stemcell.pdf> for funding such research.

**Research Projects Involving Vertebrate Animals:** Any proposal that includes research involving vertebrate animals must be in compliance with the National Research Council's "Guide for the Care and Use of Laboratory Animals" which can be obtained from National Academy Press, 2101 Constitution Avenue, NW., Washington, DC 20055. In addition, such proposals must meet the requirements of the Animal Welfare Act (7 U.S.C. 2131 et seq.), 9 CFR parts 1, 2, and 3, and if appropriate, 21 CFR part 58. These regulations do not apply to proposed research using pre-existing images of animals or to research plans that do not include live animals that are being cared for, euthanized, or used by the project participants to accomplish research goals, teaching, or testing. These regulations also do not apply to obtaining animal materials from commercial processors of animal products or to animal cell lines or tissues from tissue banks.

**Limitation of Liability:** In no event will the Department of Commerce be responsible for proposal preparation costs if these programs fail to receive funding or are cancelled because of other agency priorities. Publication of this announcement does not oblige the agency to award any specific project or to obligate any available funds.

**Executive Order 12866:** This funding notice was determined to be not significant for purposes of Executive Order 12866.

**Executive Order 13132 (Federalism):** It has been determined that this notice does not contain policies with federalism implications as that term is defined in Executive Order 13132.

**Administrative Procedure Act/Regulatory Flexibility Act:** Notice and comment are not required under the Administrative Procedure Act (5 U.S.C. 553) or any other law, for rules relating to public property, loans, grants, benefits or contracts (5 U.S.C. 553 (a)). Because notice and comment are not required under 5 U.S.C. 553, or any other law, for rules relating to public property, loans, grants, benefits or contracts (5 U.S.C. 553(a)), a Regulatory Flexibility Analysis is not required and has not been prepared for this notice, 5 U.S.C. 601 et seq



### 3. Reporting

The successful applicants will be required to complete a SF-269, Financial Status Report. In addition, each student will be required to complete an abstract that will be submitted and made a part of the official award file and will take the place of the Final Project/Performance report required as part of the closeout procedures of any award.

g. Agency Contact(s):

Ms. Anita Sweigert, Administrative Coordinator, National Institute of Standards and Technology, 100 Bureau Drive, Stop 8400, Gaithersburg, MD 20899-8400, Tel: (301) 975-4200, E-mail: [anita.sweigert@nist.gov](mailto:anita.sweigert@nist.gov). The SURF Gaithersburg program website is: <http://www.surf.nist.gov/surf2.htm>. All grants related administration questions concerning this program should be directed to Joyce Brigham, NIST Grants and Agreements Management Division at (301) 975-6328 or [joyce.brigham@nist.gov](mailto:joyce.brigham@nist.gov), or for assistance with using Grants.gov contact [support@grants.gov](mailto:support@grants.gov).